FIGURE 1
(Prior Art)

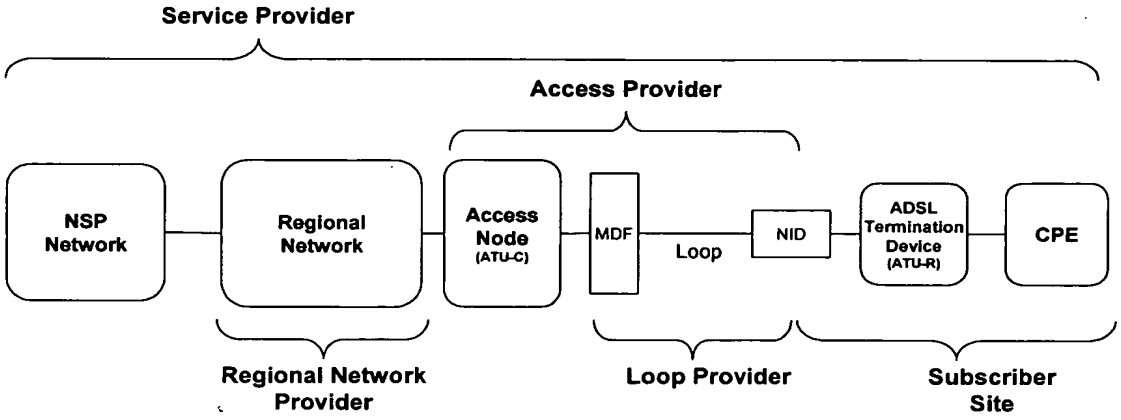


FIGURE 2
(Prior Art)

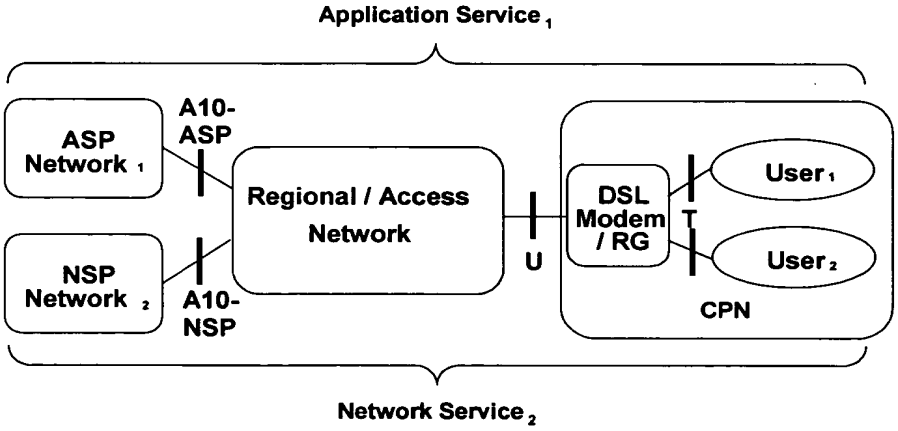


FIGURE 3
(Prior Art)

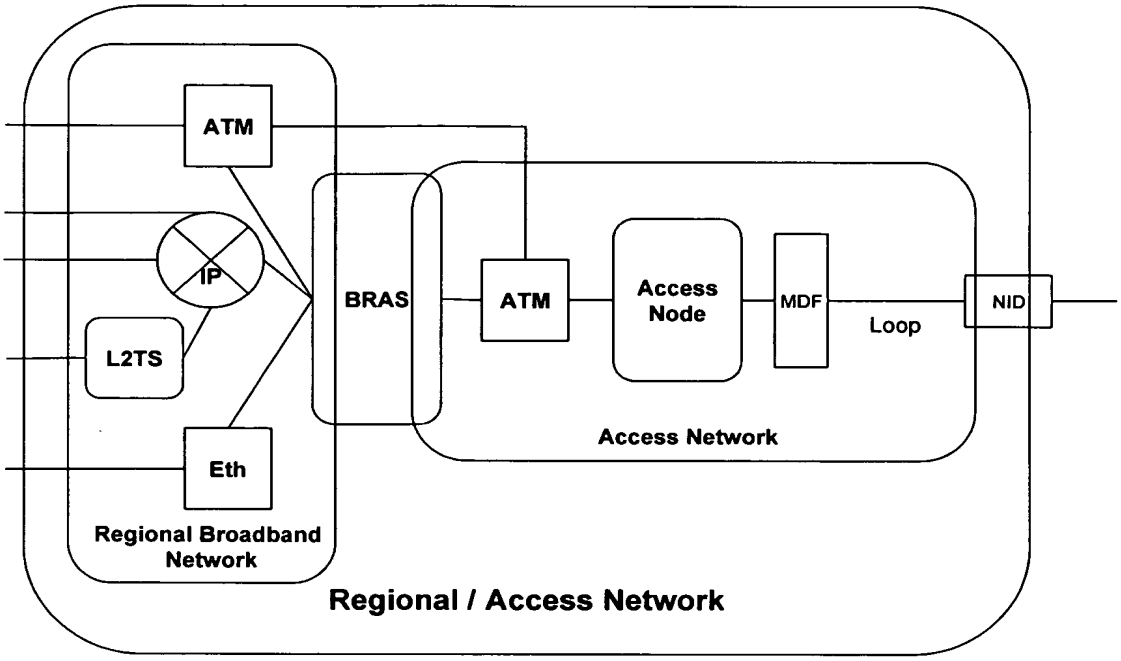


FIGURE 4
(Prior Art)

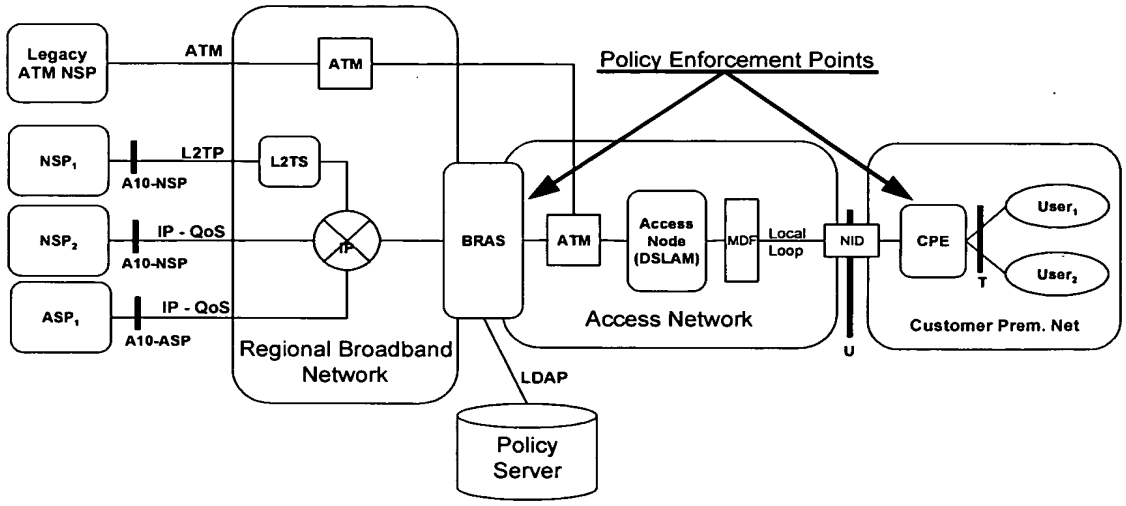


FIGURE 5

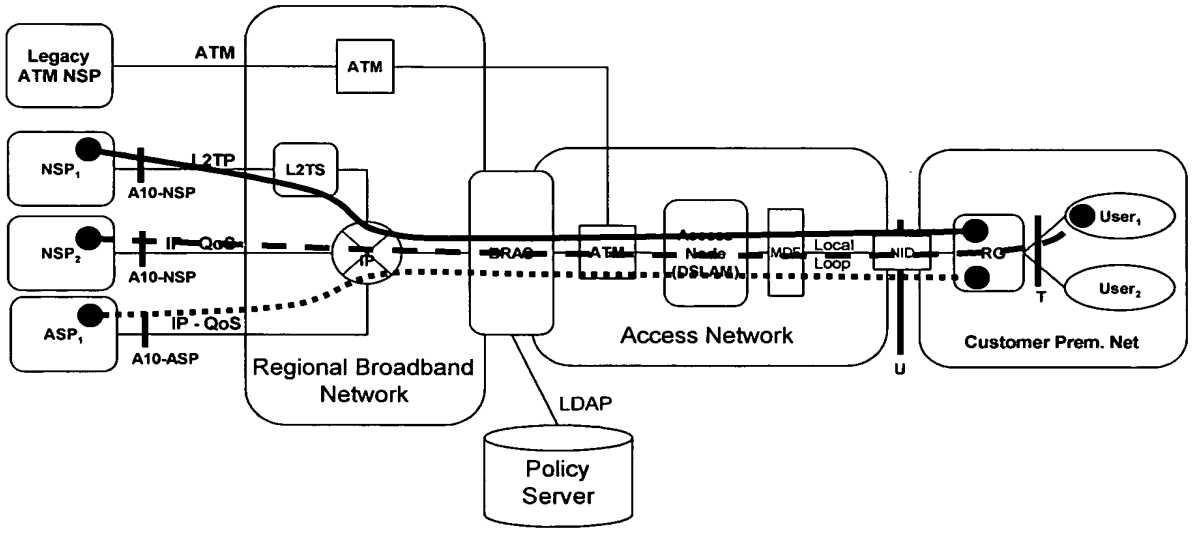


FIGURE 6

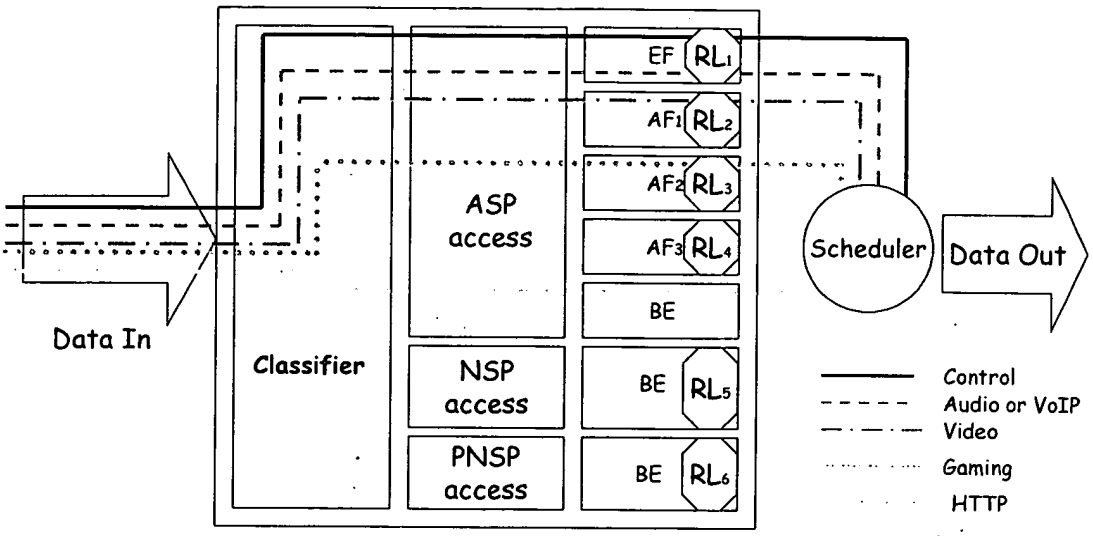


FIGURE 7

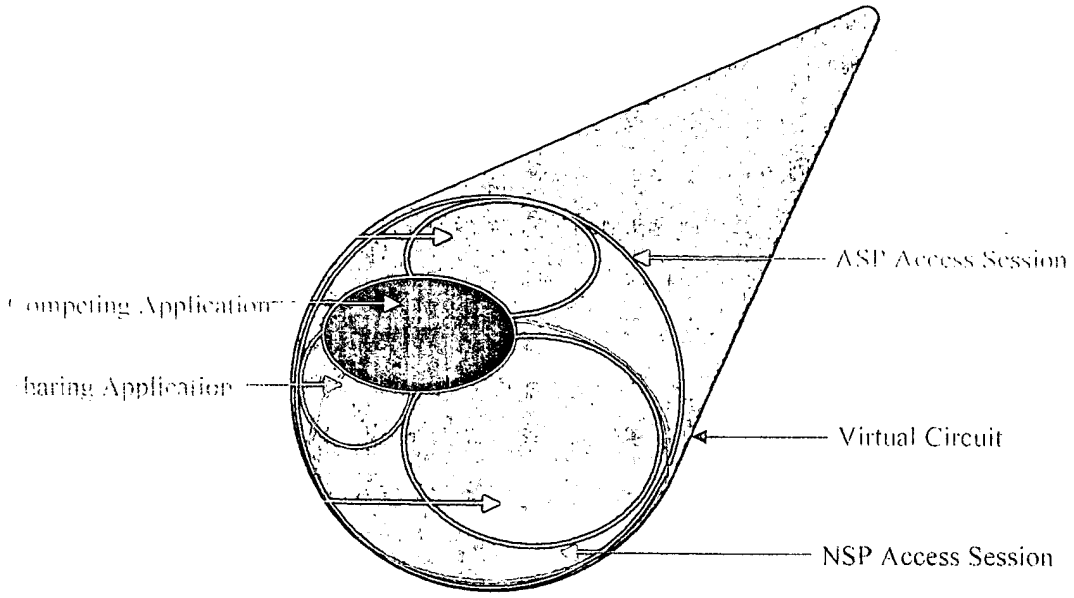
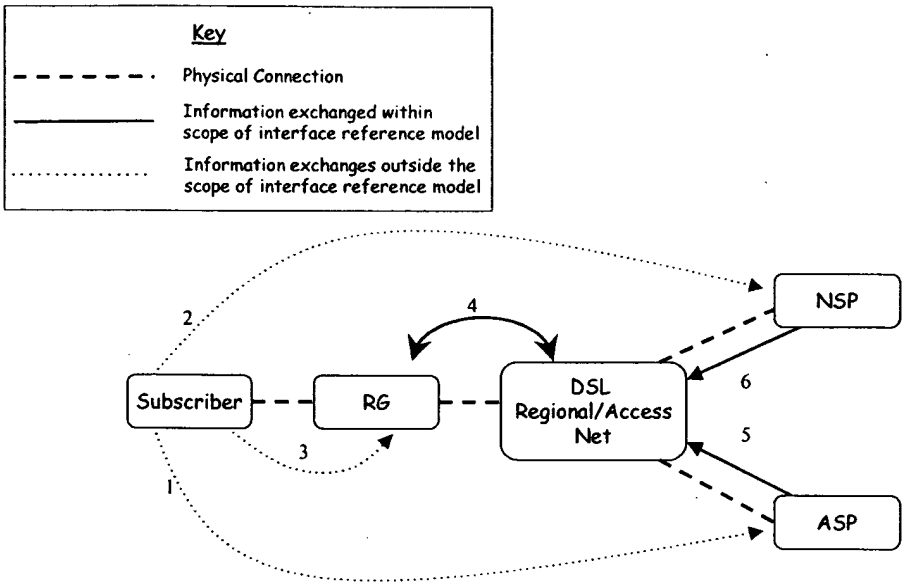


FIGURE 8



1,2: The subscriber exchanges information with the A/NSP when signing up for a service
3: The subscriber configures the RG. This may only be for the initial install. The ACS located within the Regional/Access Network may handle all subsequent conf changes
4: The RG initiates access sessions that are terminated in the DSL network. The ACS communicates with the RG for configuration updates.
5,6: The NSP communicates with the DSL network to establish a DSL connection. The ASP and NSP also communicate bandwidth and QoS changes per session or application.

900

FIGURE 9

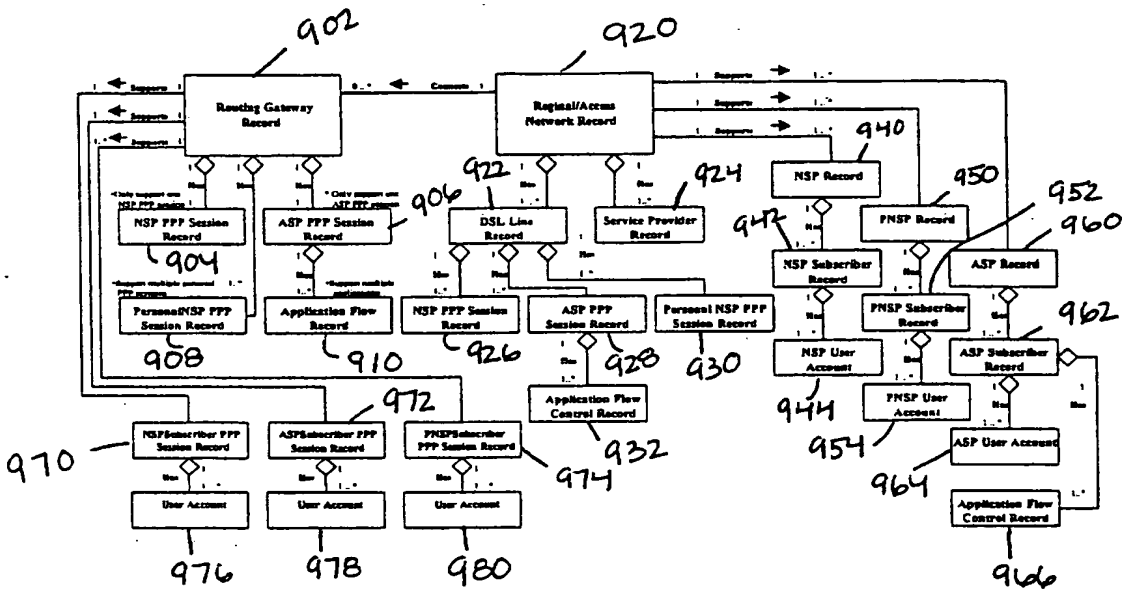

902
920
Routing Gateway Record
Regional/Access Network Record
940
922
924
NSP Record
950
952
906
NSP PPP Session Record
ASP PPP Session Record
DSL Line Record
Service Provider Record
947
PNSP Record
960
904
NSP Subscriber Record
ASP Record
PersonalNSP PPP Session Record
Application Flow Record
NSP PPP Session Record
ASP PPP Session Record
Personal NSP PPP Session Record
PNSP Subscriber Record
962
908
910
926
928
930
NSP User Account
ASP Subscriber Record
Application Flow Control Record
944
PNSP User Account
972
970
NSPSubscriber PPP Session Record
ASPSubscriber PPP Session Record
PNSPSubscriber PPP Session Record
932
954
ASP User Account
974
964
User Account
User Account
User Account
Application Flow Control Record
976
978
980
966

FIGURE 10

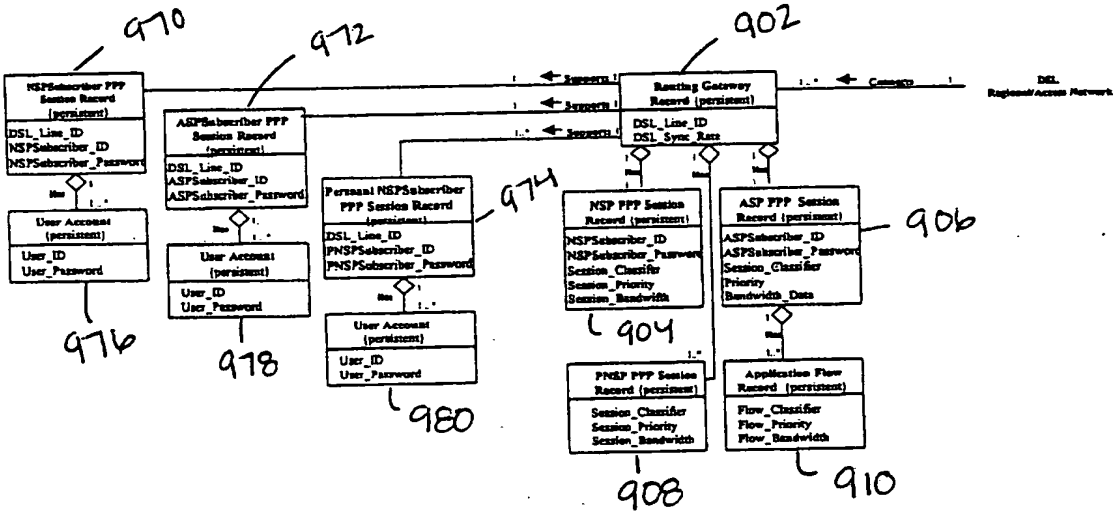

970
972
902
NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
ASPSubscriber PPP Session Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Routing Gateway Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
DSL Regional Access Network
Personal NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
974
NSP PPP Session Record (persistent)
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
ASP PPP Session Record (persistent)
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Priority
Bandwidth_Data
906
User Account (persistent)
User_ID
User_Password
976
User Account (persistent)
User_ID
User_Password
978
User Account (persistent)
User_ID
User_Password
980
904
PNSP PPP Session Record (persistent)
Session_Classifier
Session_Priority
Session_Bandwidth
908
Application Flow Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
910

FIGURE 11

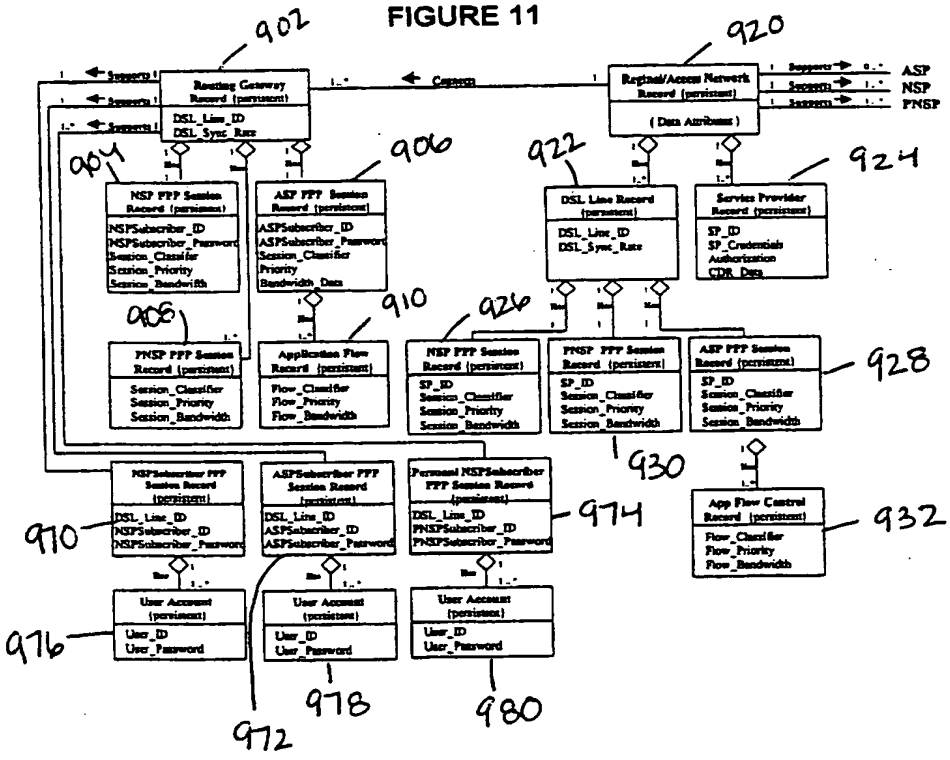

902
Routing Gateway Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
920
Regional/Access Network Record (persistent)
(Data Attributes)
ASP
NSP
PNSP
904
906
922
924
NSP PPP Session Record (persistent)
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
ASP PPP Session Record (persistent)
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Priority
Bandwidth_Data
DSL Line Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
Service Provider Record (persistent)
SP_ID
SP_Credentials
Authorization
CDR_Data
908
910
926
928
PNSP PPP Session Record (persistent)
Session_Classifier
Session_Priority
Session_Bandwidth
Application Flow Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
NSP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
PNSP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
ASP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
930
NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
ASPSubscriber PPP Session Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Permanent NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
974
App Flow Control Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
932
910
User Account (persistent)
User_ID
User_Password
User Account (persistent)
User_ID
User_Password
User Account (persistent)
User_ID
User_Password
976
978
980
972

FIGURE 12

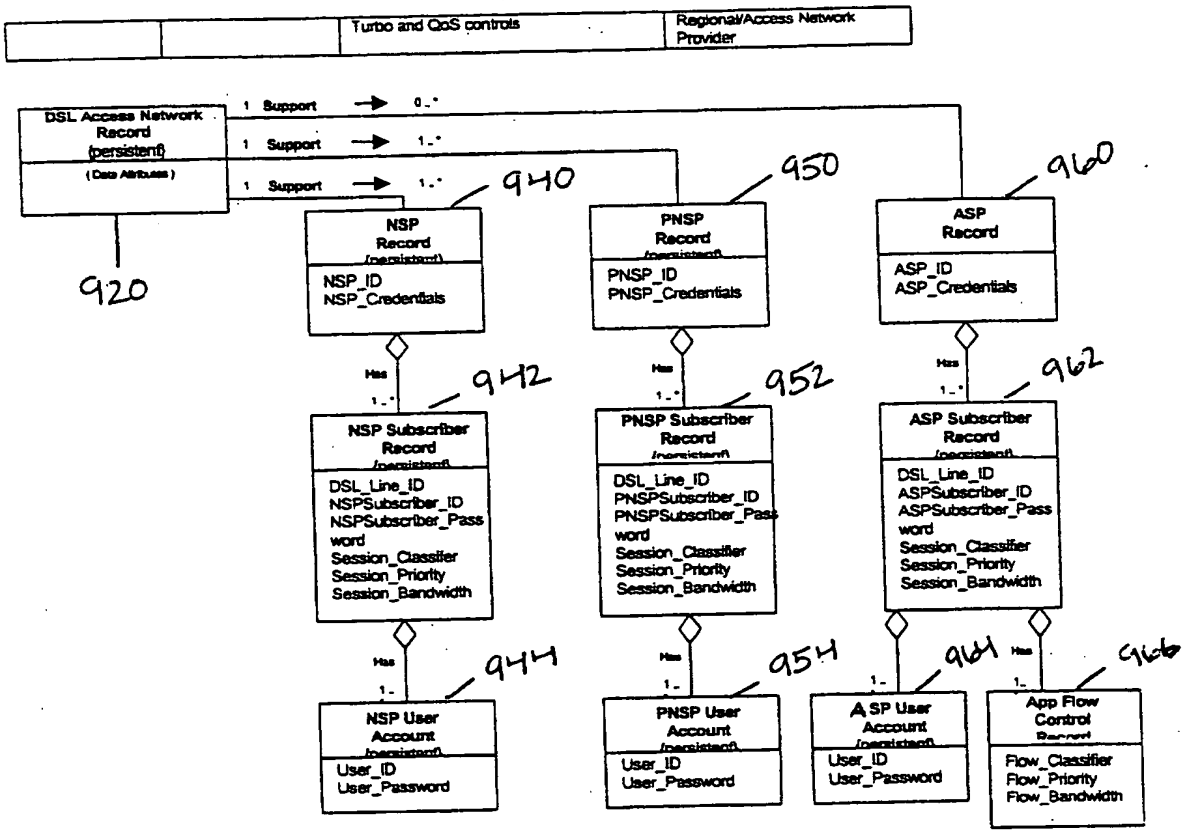

Turbo and QoS controls
Regional/Access Network Provider
DSL Access Network Record (persistent)
(Data Attributes)
1 Support 0..*
1 Support 1..*
1 Support 1..*
920
NSP Record (persistent)
NSP_ID
NSP_Credentials
940
PNSP Record (persistent)
PNSP_ID
PNSP_Credentials
950
ASP Record
ASP_ID
ASP_Credentials
960
Has 1..*
NSP Subscriber Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
942
PNSP Subscriber Record (persistent)
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
952
ASP Subscriber Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
962
Has 1..
NSP User Account (persistent)
User_ID
User_Password
944
PNSP User Account (persistent)
User_ID
User_Password
954
ASP User Account (persistent)
User_ID
User_Password
964
App Flow Control Record
Flow_Classifier
Flow_Priority
Flow_Bandwidth
966

FIGURE 13

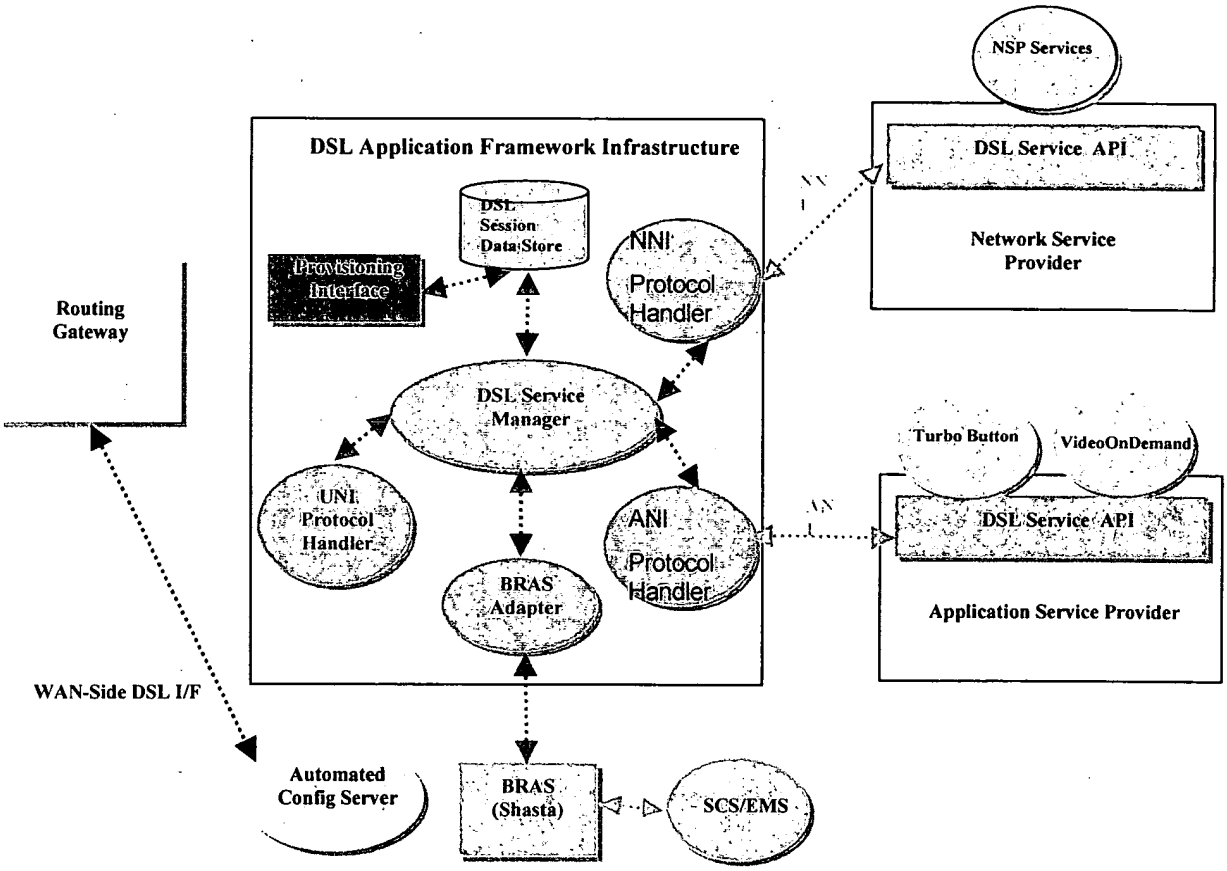

NSP Services
DSL Application Framework Infrastructure
DSL Service API
DSL Session Data Store
Provisioning Interface
NNI Protocol Handler
Network Service Provider
Routing Gateway
DSL Service Manager
Turbo Button
VideoOnDemand
UNI Protocol Handler
ANI Protocol Handler
DSL Service API
BRAS Adapter
Application Service Provider
WAN-Side DSL I/F
Automated Config Server
BRAS (Shasta)
SCS/EMS

FIGURE 14

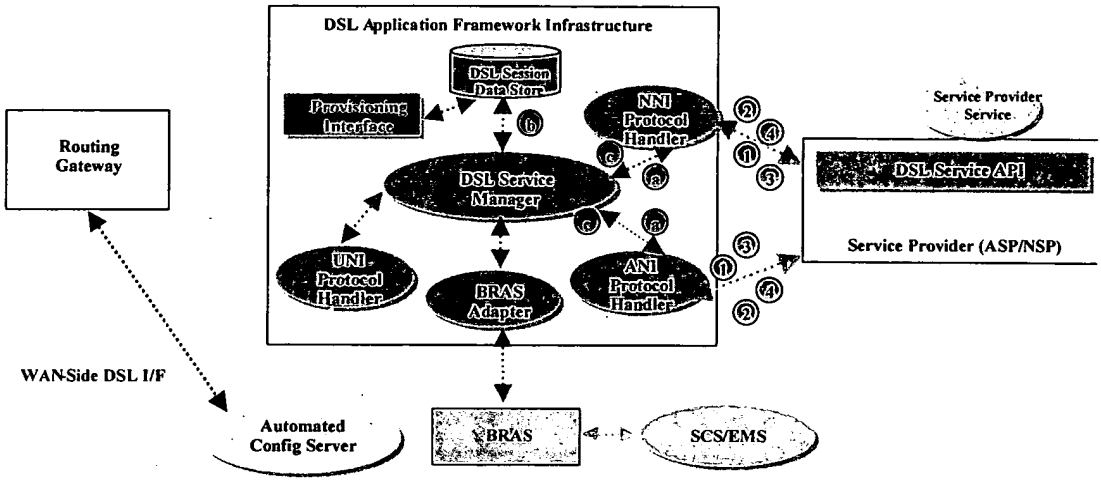


FIGURE 15

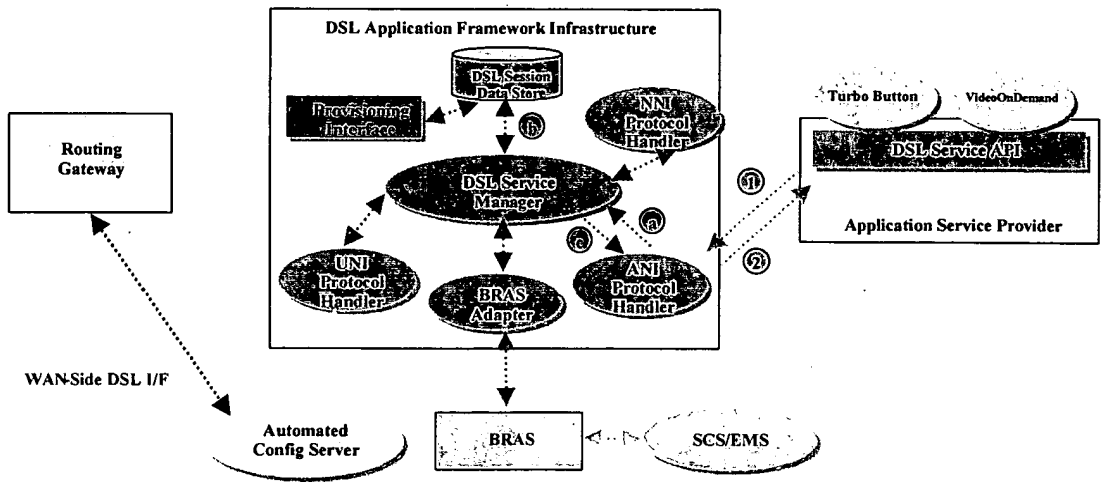


FIGURE 16

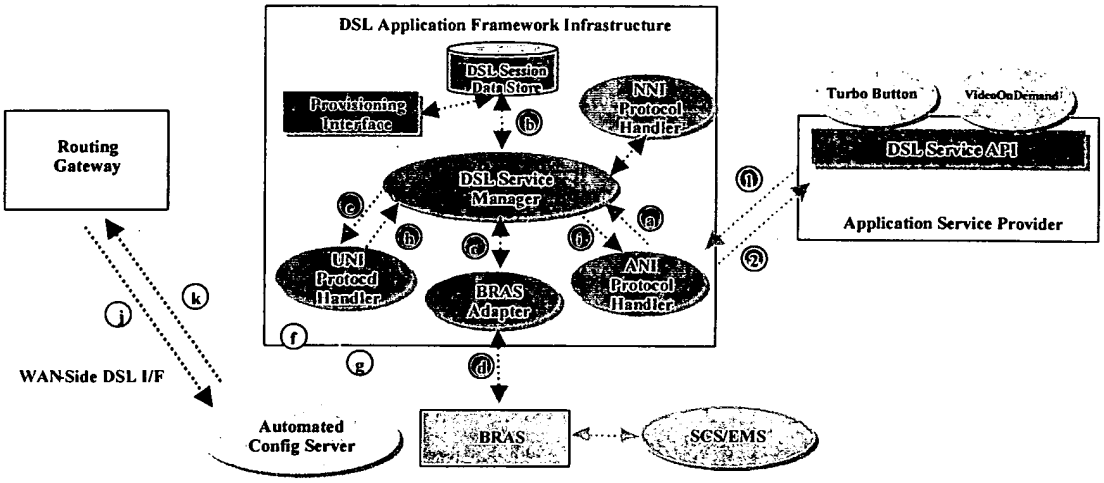


FIGURE 17

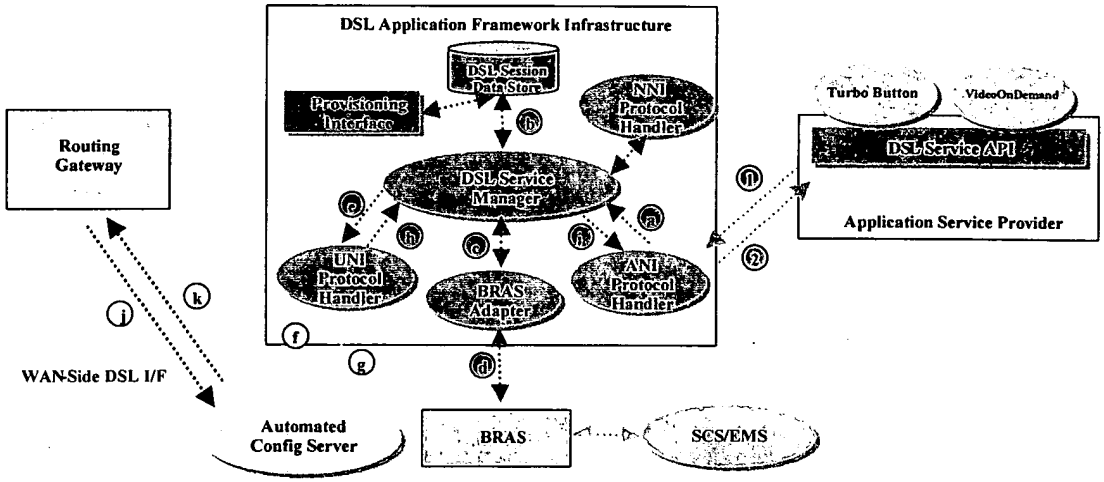


FIGURE 18

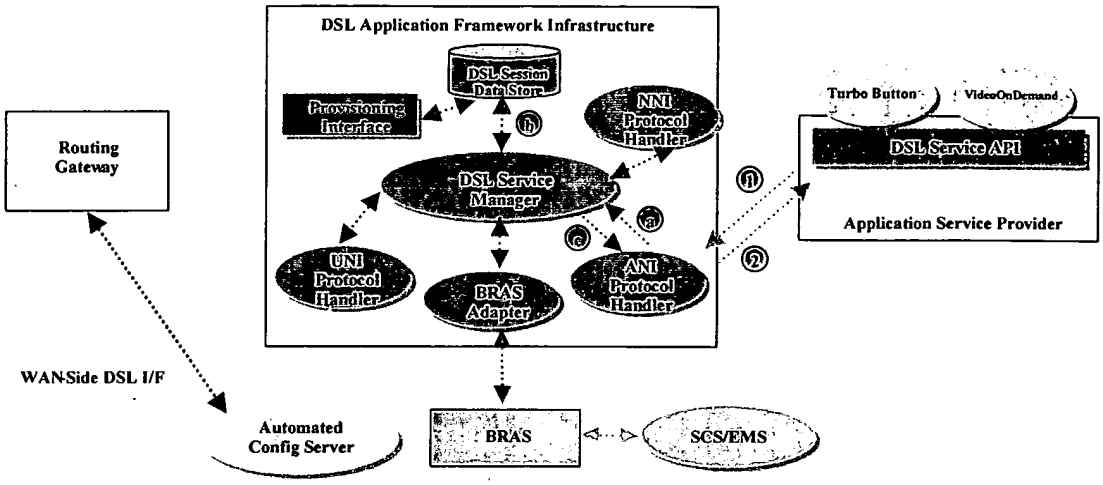


FIGURE 19

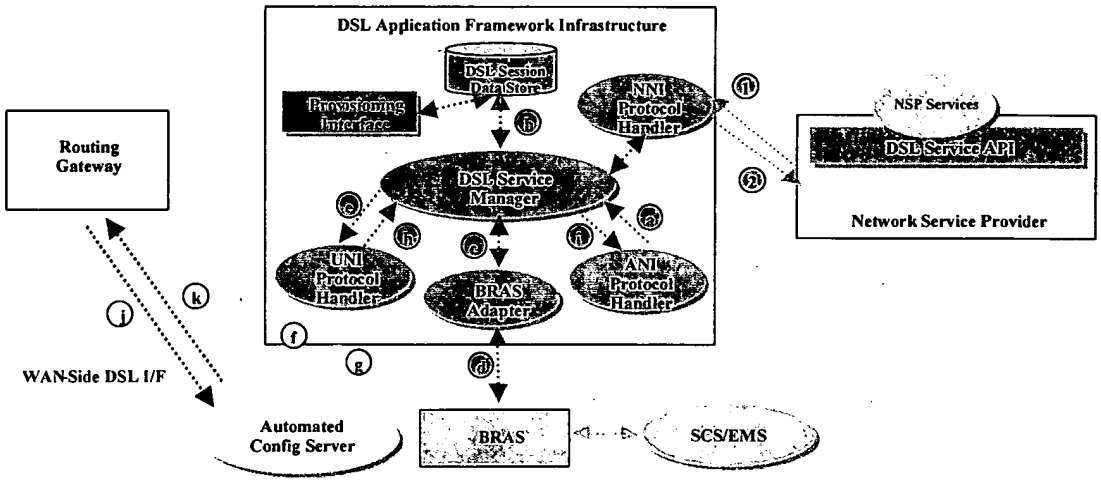


FIGURE 20

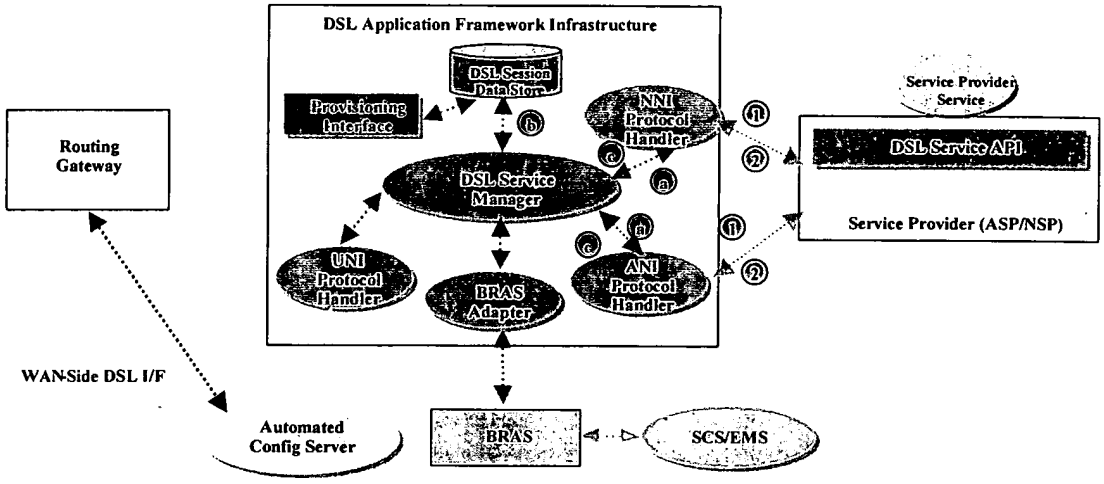


FIGURE 21

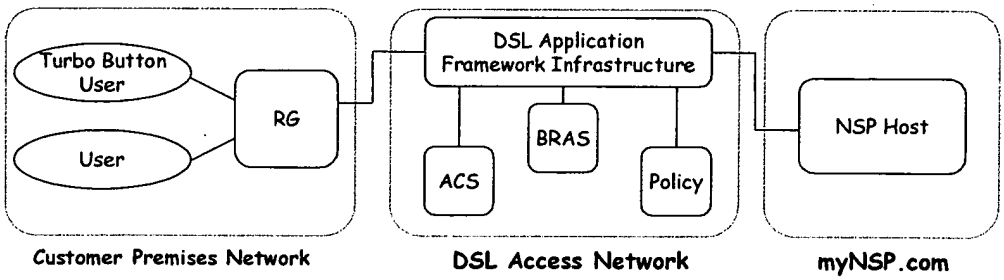


FIGURE 22

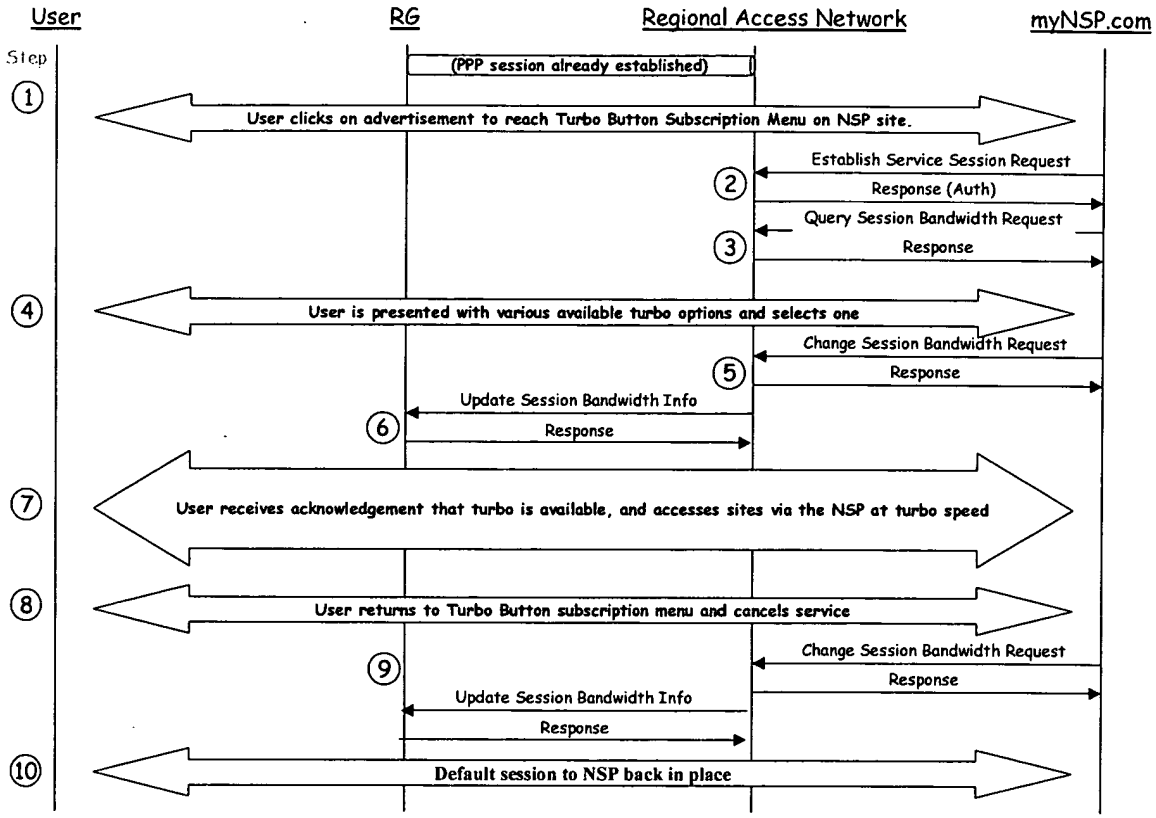

User
RG
Regional Access Network
myNSP.com
Step
(PPP session already established)
1
User clicks on advertisement to reach Turbo Button Subscription Menu on NSP site.
Establish Service Session Request
2
Response (Auth)
Query Session Bandwidth Request
3
Response
4
User is presented with various available turbo options and selects one
Change Session Bandwidth Request
5
Response
Update Session Bandwidth Info
6
Response
7
User receives acknowledgement that turbo is available, and accesses sites via the NSP at turbo speed
8
User returns to Turbo Button subscription menu and cancels service
Change Session Bandwidth Request
9
Response
Update Session Bandwidth Info
Response
10
Default session to NSP back in place

FIGURE 23

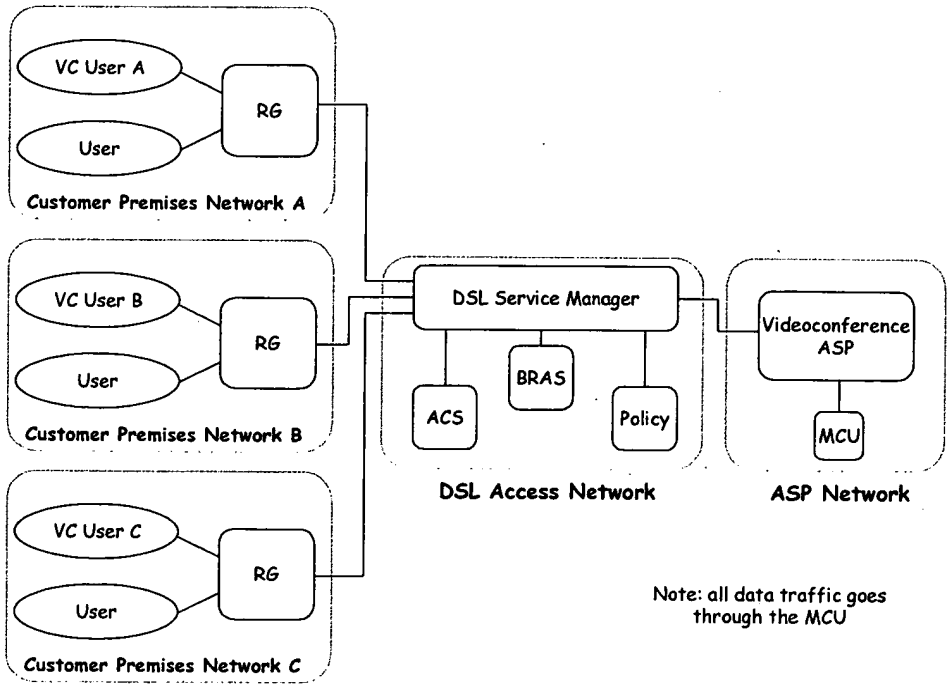

VC User A
User
RG
Customer Premises Network A
VC User B
User
RG
Customer Premises Network B
VC User C
User
RG
Customer Premises Network C
DSL Service Manager
ACS
BRAS
Policy
DSL Access Network
Videoconference ASP
MCU
ASP Network
Note: all data traffic goes through the MCU

FIGURE 24

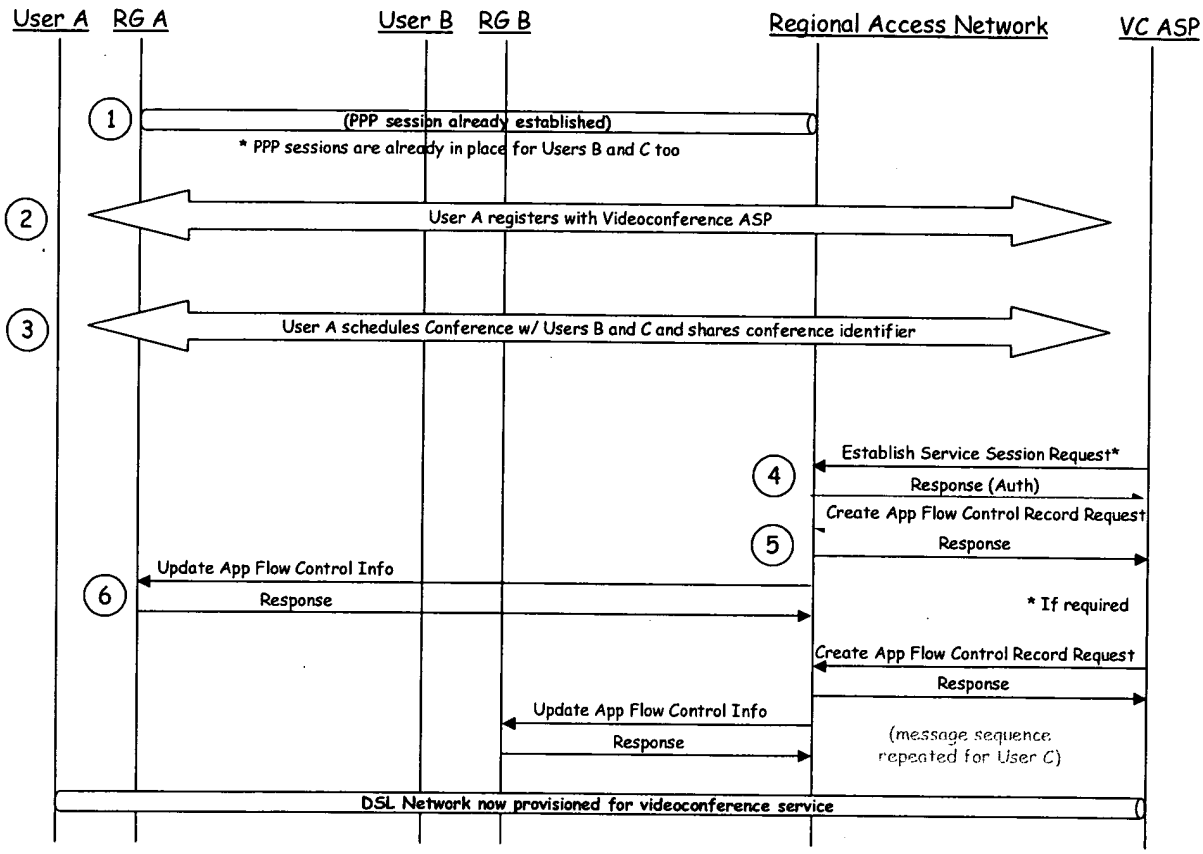

User A
RG A
User B
RG B
Regional Access Network
VC ASP
1
(PPP session already established)
* PPP sessions are already in place for Users B and C too
2
User A registers with Videoconference ASP
3
User A schedules Conference w/ Users B and C and shares conference identifier
4
Establish Service Session Request*
Response (Auth)
Create App Flow Control Record Request
5
Response
6
Update App Flow Control Info
Response
* If required
Create App Flow Control Record Request
Response
Update App Flow Control Info
Response
(message sequence repeated for User C)
DSL Network now provisioned for videoconference service

FIGURE 25

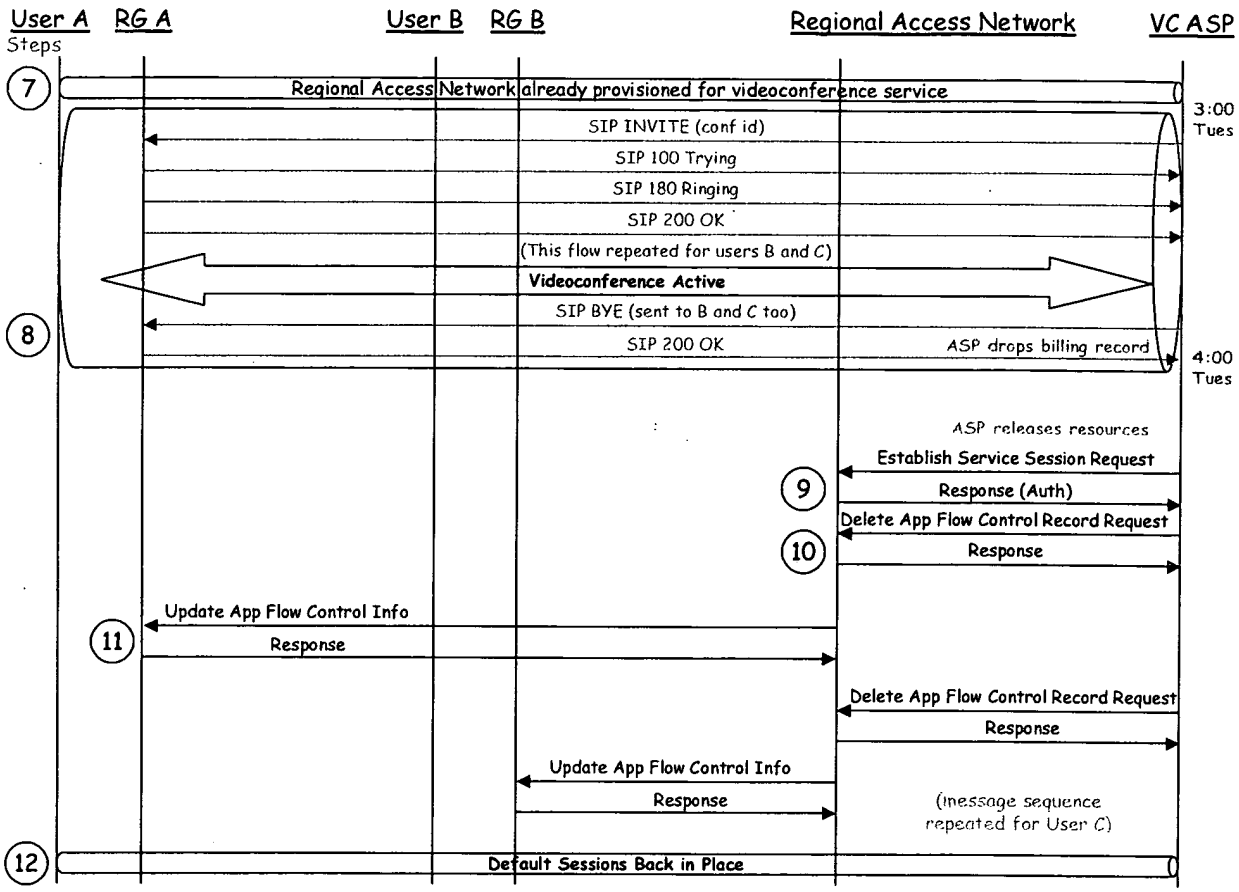

User A
RG A
User B
RG B
Regional Access Network
VC ASP
Steps
7
Regional Access Network already provisioned for videoconference service
3:00 Tues
SIP INVITE (conf id)
SIP 100 Trying
SIP 180 Ringing
SIP 200 OK
(This flow repeated for users B and C)
Videoconference Active
SIP BYE (sent to B and C too)
8
SIP 200 OK
ASP drops billing record
4:00 Tues
ASP releases resources
Establish Service Session Request
9
Response (Auth)
Delete App Flow Control Record Request
10
Response
Update App Flow Control Info
11
Response
Delete App Flow Control Record Request
Response
Update App Flow Control Info
Response
(message sequence repeated for User C)
12
Default Sessions Back in Place

FIGURE 26

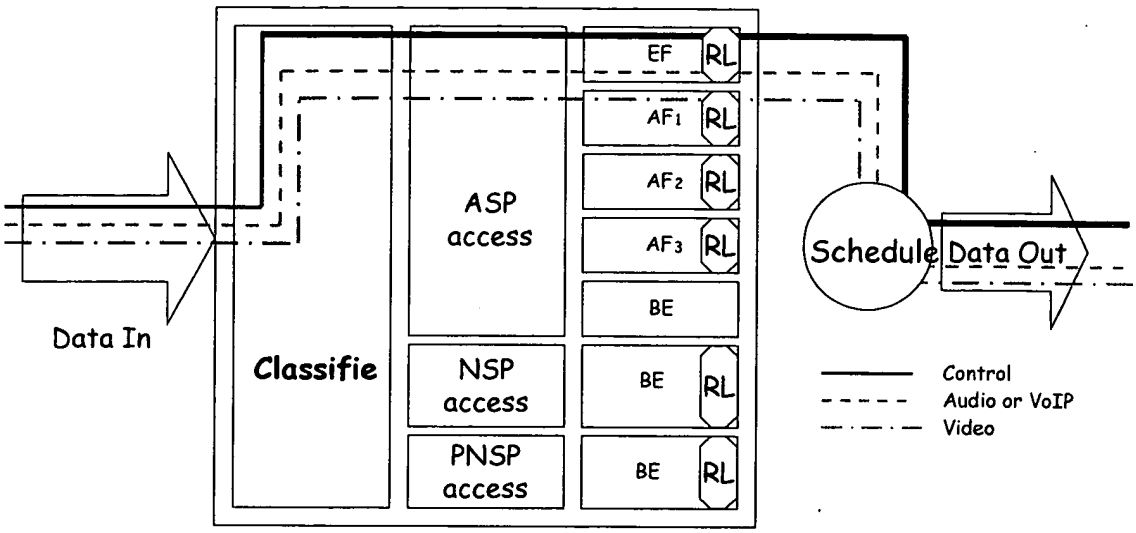
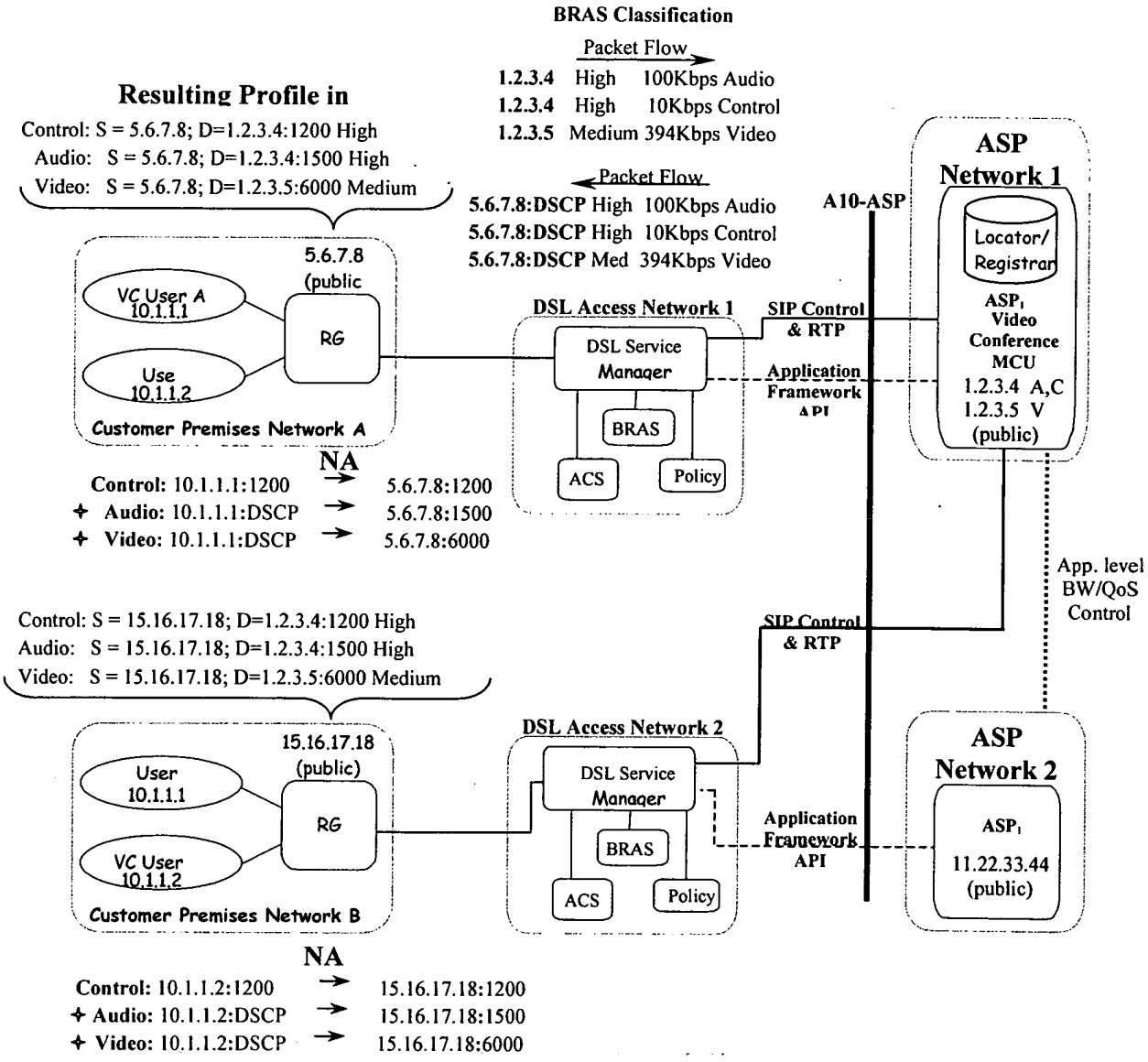

Data In
Classifie
ASP access
NSP access
PNSP access
EF
AF1
AF2
AF3
BE
BE
BE
RL
RL
RL
RL
RL
RL
Schedule
Data Out
Control
Audio or VoIP
Video

FIGURE 27



✦ These flows are set up dynamically at the VC client and the DSCP are assigned for the audio and the video streams. The ALG/NAT maps the 10.X.X.X ports to the corresponding IP address and ports for audio and video specified in the ACS profile based on the DSCP set by the VC client. This ensures that the RG, BRAS, and ASP videoconference MCU maintain consistent port information with regard to the various flows.

FIGURE 28

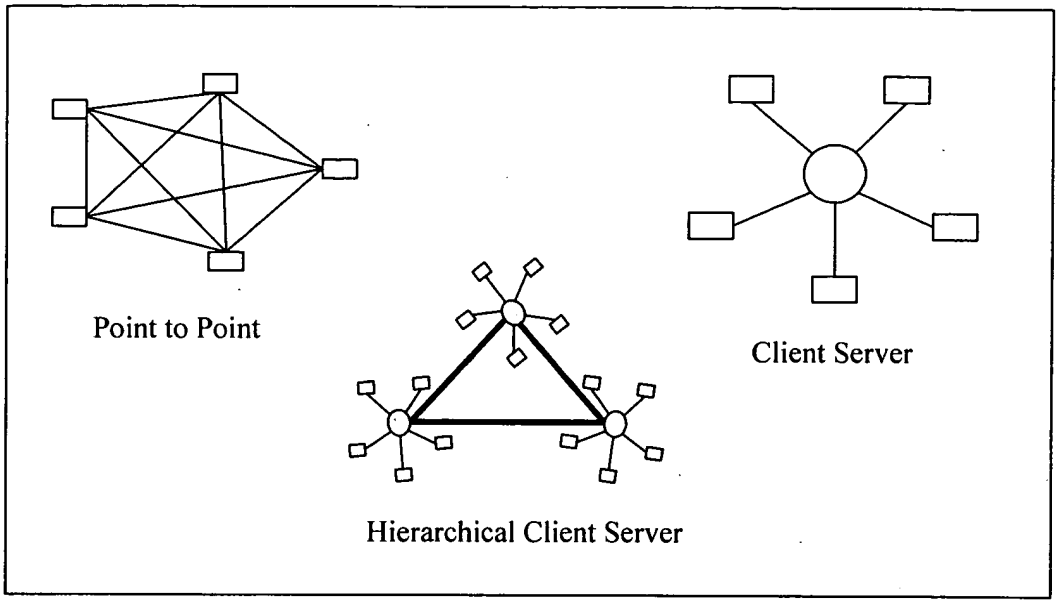


FIGURE 29

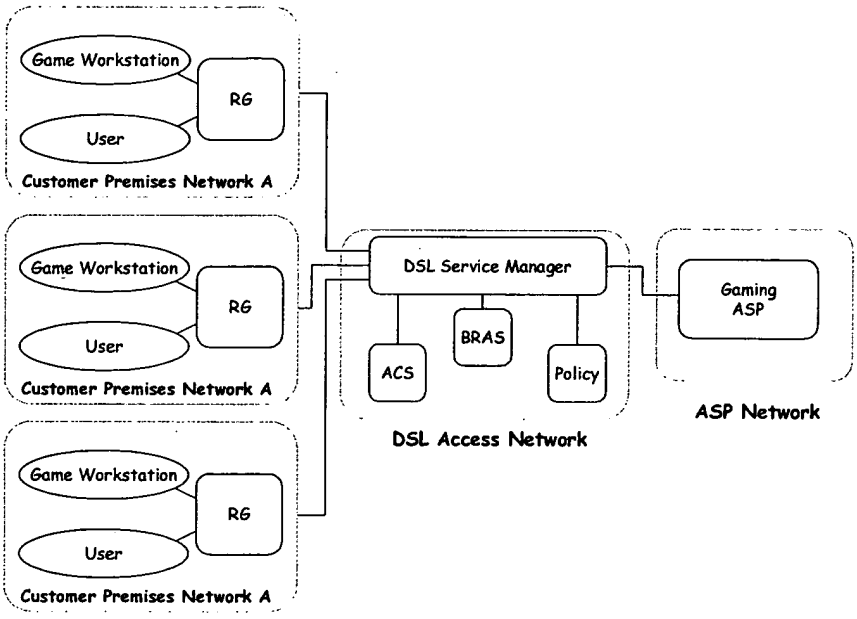

Game Workstation
RG
User
Customer Premises Network A
Game Workstation
RG
User
Customer Premises Network A
Game Workstation
RG
User
Customer Premises Network A
DSL Service Manager
ACS
BRAS
Policy
DSL Access Network
Gaming ASP
ASP Network

FIGURE 30

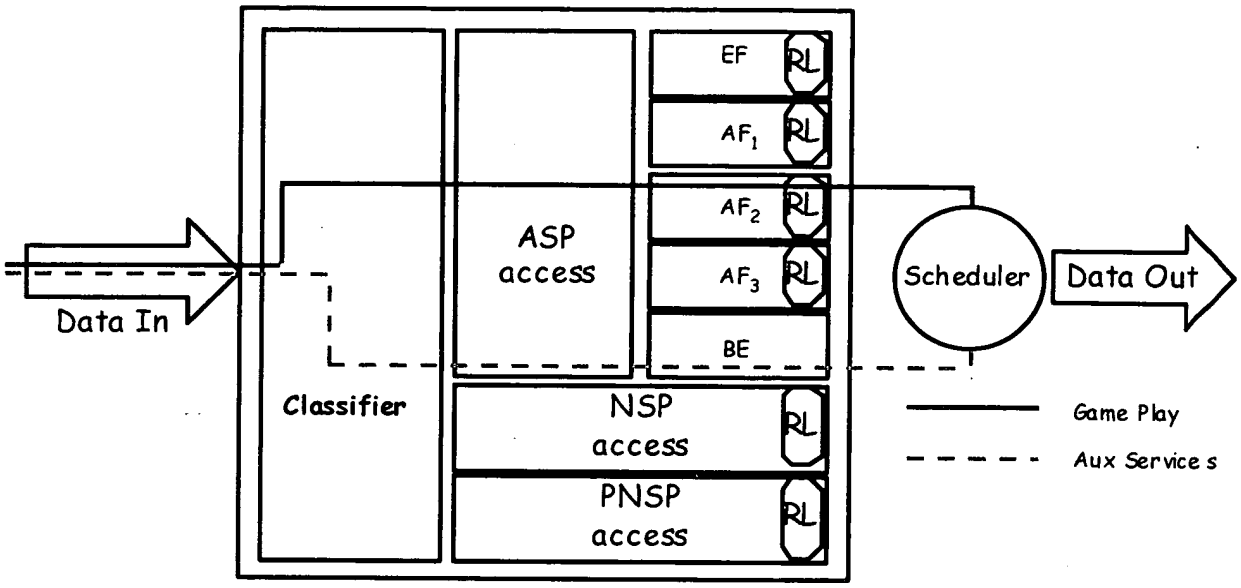
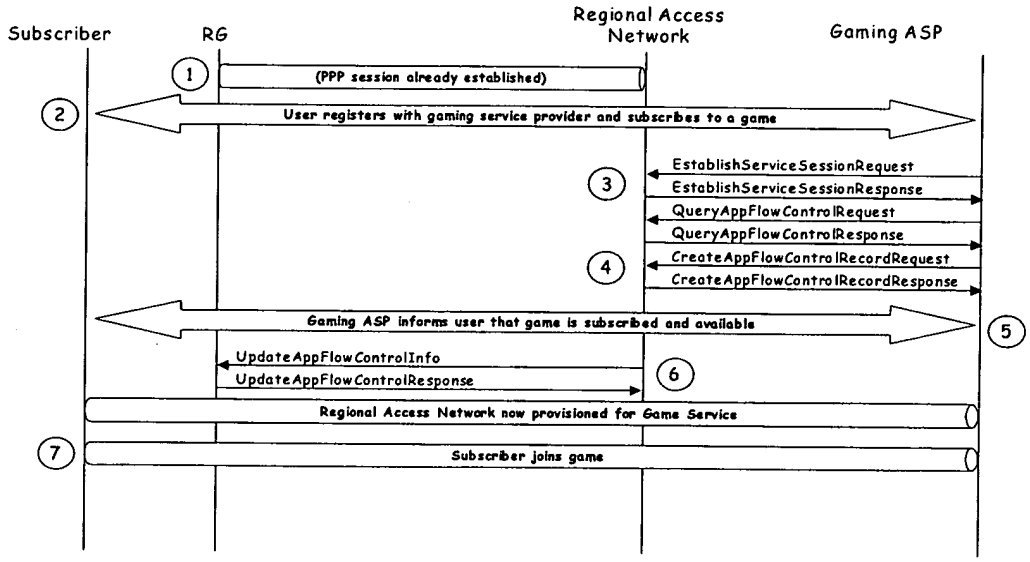

EF
RL
AF1
RL
AF2
RL
AF3
RL
BE
ASP
access
Scheduler
Data Out
Data In
Classifier
NSP
access
RL
PNSP
access
RL
Game Play
Aux Services

FIGURE 31


Subscriber
RG
Regional Access Network
Gaming ASP
1
(PPP session already established)
2
User registers with gaming service provider and subscribes to a game
3
EstablishServiceSessionRequest
EstablishServiceSessionResponse
QueryAppFlowControlRequest
QueryAppFlowControlResponse
4
CreateAppFlowControlRecordRequest
CreateAppFlowControlRecordResponse
Gaming ASP informs user that game is subscribed and available
5
UpdateAppFlowControlInfo
UpdateAppFlowControlResponse
6
Regional Access Network now provisioned for Game Service
7
Subscriber joins game